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FM 4–50

WAR DEPARTMENT

COAST ARTILLERY FIELD MANUAL

SEACOAST ARTILLERY

SERVICE OF THE PIECE

8-INCH GUN, RAILWAY ARTILLERY

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FM 4-50

COAST ARTILLERY FIELD MANUAL

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SERVICE OF THE PIECE

8-INCH GUN, RAILWAY ARTILLERY

Prepared under direction of the
Chief of Coast Artillery

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

OFFICIAL:

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8-INCH GUN, RAILWAY ARTILLERY

(The matter contained herein supersedes TR 435–235, March 1, 1928.)

SECTION I

GENERAL

■ 1. SCOPE.—*a.* This manual prescribes the service of the piece for the 8-inch gun, railway artillery. It is applicable to the M1888, M1888MI, M1888MII, and Mk. V guns, mounted on M1918 or M1918MI barbette carriage and M1918MI railway car. The duties of the members of the gun section in the service of the piece are contained in section III and in the drill table, section XI.

b. The emplacing and the service of the piece as described herein are intended as a guide for the battery commander. Changes in the details of the emplacing and the service of the piece may be made to meet local conditions.

■ 2. REFERENCES.—The references listed in the Appendix should be consulted, especially those pertaining to ammunition and to the operation, care, and maintenance of matériel.

SECTION II

ORGANIZATION

■ 3. GUN SECTION.—Each emplacement of one gun is manned by a gun section consisting of a gun squad and an ammunition squad. The war strength of the gun section is 26 enlisted men; the peace strength is 24 enlisted men (T/O 4–47).

■ 4. GUN SQUAD.—At war strength the gun squad (18 enlisted men) consists of the gun commander (chief of section), gun

pointer, elevation setter, battery commander telephone operator, azimuth (deflection) display board operator, elevation display board operator, aiming rule operator, chief of breech,

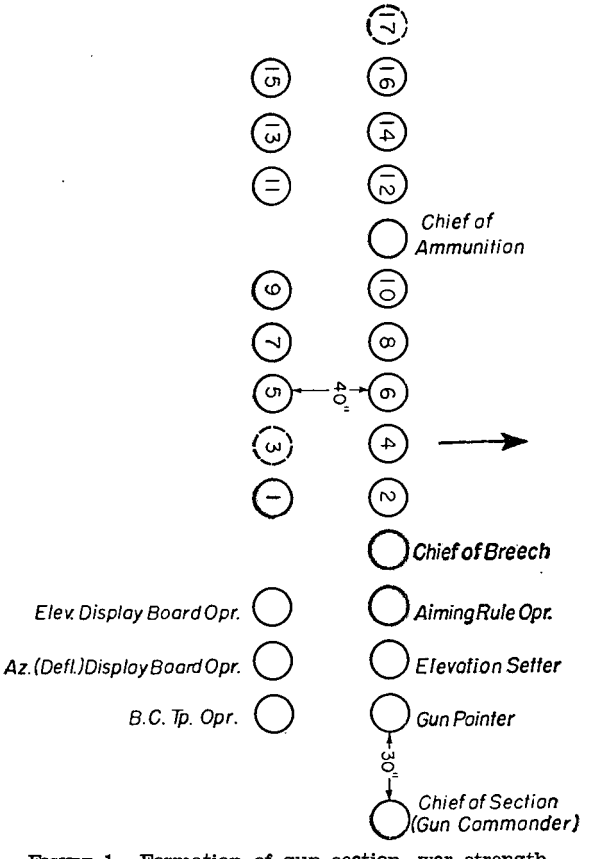

FIGURE 1.—Formation of gun section, war strength.
NOTE.—At peace strength Nos. 3 and 17 are eliminated.

and 10 cannoneers numbered from 1 to 10, inclusive. At peace strength the gun squad consists of 17 enlisted men,

No. 3 (traversing detail) being eliminated. Men are assigned to permanent positions according to their aptitude but will be interchanged frequently in drill positions to develop flexibility and facilitate replacement.

■ 5. AMMUNITION SQUAD.—At war strength the ammunition squad (8 enlisted men) consists of the chief of ammunition and 7 ammunition handlers numbered from 11 to 17, inclusive. This squad is divided by its chief into details for the service of powder and projectiles and miscellaneous duties required by local conditions. At peace strength the ammunition squad consists of 7 enlisted men, No. 17 being eliminated.

■ 6. FORMATION.—Each section assembles in two ranks with 4 inches between files and 40 inches between ranks. Unnumbered cannoneers form on the right of their squads in both front and rear ranks. Numbered cannoneers form in the order of their numbers from the right, even numbers in the front rank and odd numbers in the rear rank. The chief of ammunition forms in the front rank on the right of his squad and is not covered off. After forming the section, the chief of section takes post in the front rank 30 inches to the right of the gun pointer. (See fig. 1.)

SECTION III

DUTIES OF PERSONNEL

■ 7. BATTERY EXECUTIVE.—*a.* The battery executive commands the firing section of the battery and is in charge of the gun emplacements and accessories. He is responsible to the battery commander for the—

(1) Training and efficiency of the personnel of the firing section.

(2) Condition of the matériel under his charge.

(3) Observance of all safety precautions pertaining to the service of the piece.

(4) Police of all emplacements.

(5) Emplacement of the guns when they are moved into position, and their preparation for railroad travel when they are taken out of position.

b. He inspects the matériel under his charge and personally verifies the adjustment of all pointing devices as frequently as necessary to insure accuracy. He or an assistant battery executive tests all firing devices before each drill or firing, paying special attention to the safety features.

c. He receives the reports of the assistant battery executives or chiefs of sections and reports to the battery commander, "Sir, firing section in order," or reports defects which he is unable to remedy without delay.

d. He exercises general supervision over the loading and pointing. If for any reason he desires to hold fire for one firing interval, he commands: RE-LAY, and reports his action to the battery commander.

e. At the conclusion of drill or firing the battery executive commands: REPLACE EQUIPMENT, inspects the emplacements, and reports to the battery commander.

f. He selects the positions for and supervises the emplacement and employment of the machine guns of the firing section.

g. As battery railway officer he is responsible for the condition and maintenance of the railway matériel assigned to the battery.

■ 8. ASSISTANT BATTERY EXECUTIVE.—Each assistant battery executive will perform the duties of the battery executive insofar as they pertain to the emplacement or emplacements to which he is assigned.

■ 9. CHIEF OF SECTION.—*a.* The chief of section (gun commander), a noncommissioned officer, is in command of the gun section and is also chief of the gun squad. He is responsible to the officer in charge of the emplacement for the—

(1) Training and efficiency of the personnel of his section.

(2) Condition of the matériel under his charge.

(3) Emplacement of the piece and its preparation for firing, including camouflage discipline and gas discipline when necessary.

(4) Firing of the piece.

(5) Observance of all safety precautions pertaining to the service of the piece.

(6) Police of the emplacement.

b. He supervises the preparation of the firing position, the emplacement of the mount, the removing of it from position, the unloading and loading of equipment, the service of the piece, and the service of ammunition, giving the necessary commands and instructions for carrying out these operations. He personally directs the work of care and preservation of the matériel.

c. The gun being emplaced for firing, he commands: 1. DETAILS, 2. POSTS, and supervises the procuring of equipment.

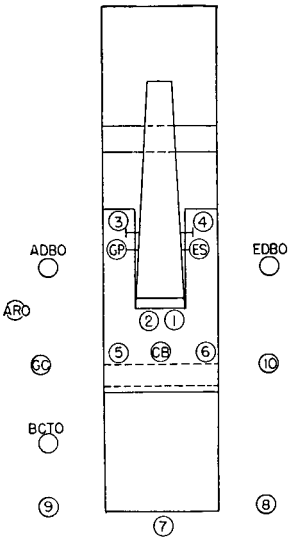

FIGURE 2.—Positions at DETAILS, POSTS

After all details have reached their posts (fig. 2), he commands: EXAMINE GUN. He then makes an inspection of the gun, carriage, and other matériel, paying special attention to the recoil and recuperator systems, clearance of the trunnions (see par. 48*b*), firing mechanism, safety devices, oiling of the various bearings, and the condition of the track, H-beams, cross ties, outriggers, and floats. He receives the reports of the chief of ammunition and of the various details

of the gun squad, and reports to the officer in charge of the emplacement, "Sir, No. ——— in order," or any defects which he is unable to remedy without delay.

d. When necessary to verify the section, he commands: CALL OFF. At this command the cannoneers in each squad call off their titles or numbers in succession, beginning with unnumbered members of the section, followed by the numbered members in order.

e. He informs the chief of ammunition as to the projectile, fuze, and powder charge to be used.

f. At the command TARGET, he repeats the command and the target designation. As soon as the gun pointer is on the target (or aiming point), the gun commander reports or signals to the officer in charge of the emplacement, "Sir, No. ——— on target."

g. At the command LOAD, he repeats the command and supervises the loading. After the piece is loaded and laid, he calls, "No. ——— ready." He also commands: LOAD, before each shot of a series. The piece is not fired, however, until the command COMMENCE FIRING is given and the proper firing signal received.

h. At the command COMMENCE FIRING, if the piece is unloaded he commands: LOAD, and supervises the work of his section. After the piece is loaded and laid he sees that all personnel are clear.

i. He commands: CEASE FIRING, when the number of shots specified has been fired. He repeats the command CEASE FIRING when it is received. At the conclusion of a series of shots he reports, "Sir, No. ——— (so many) rounds fired." When dummy ammunition is used, he commands: UNLOAD, and supervises the unloading.

j. During the firing he stations himself in such a position as best to observe the functioning of the gun squad and the gun. He pays particular attention to the action of the gun in recoil and counterrecoil in order that a loss of recoil oil by leakage may be corrected.

k. In case of a misfire, he calls, "No. ——— misfire." He sees that the precautions described in paragraph 39 are observed.

l. When firing on a time interval signal, he commands: RE-LAY in case the time interval signal fails to sound at the gun, or in case his gun is not ready to fire when the time interval signal sounds. He repeats the command RE-LAY when it is received.

m. At the command REPLACE EQUIPMENT, he supervises the replacing of all equipment, sees that all matériel is properly secured and the emplacement policed, and then unless otherwise directed forms his section.

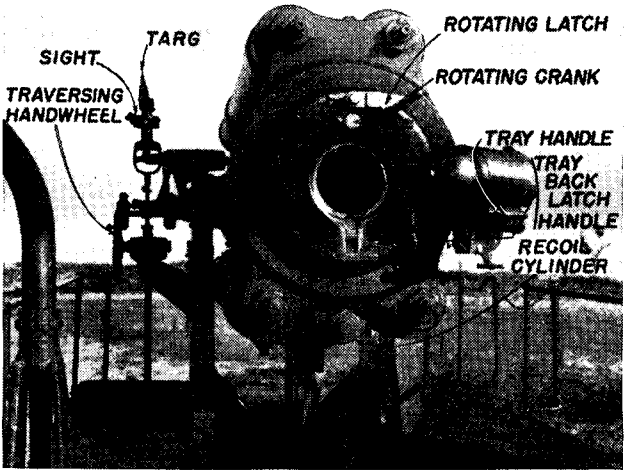

FIGURE 3.—Rear view of 8-inch gun.

■ 10. GUN POINTER.—The gun pointer (noncommissioned officer) is charged with the duty of pointing the piece in direction. He is responsible to the gun commander for the proper operation, care, and adjustment of the sight, azimuth circle, traversing mechanism, and for the supervision of the aiming rule operator. (See fig. 3.) For detailed duties of the gun pointer see drill table, section XI.

■ 11. ELEVATION SETTER.—The elevation setter is charged with the duty of laying the piece in elevation. He is responsible

to the gun commander for the proper operation, care, and adjustment of the quadrant and the elevating mechanism. For detailed duties of the elevation setter see drill table, section XI.

■ 12. CHIEF OF BREECH.—The chief of breech (noncommissioned officer) is responsible to the gun commander for the efficiency of the personnel of the breech detail; for the condition and serviceability of the breech mechanism, breechblock, breech recess, firing mechanism, chamber, and bore (see fig. 3); for the observance of safety precautions insofar as they pertain to his detail; and for the proper loading of the piece. He pays particular attention to the seating of the projectile and sees that the igniter is on the rear end of the powder charge. He attaches the lanyard. For detailed duties of the chief of breech see drill table, section XI.

■ 13. BATTERY COMMANDER TELEPHONE OPERATOR.—*a.* The battery commander telephone operator is charged with the duty of receiving and transmitting all messages passing between the battery commander and the officer in charge of the emplacement and the keeping of such records as may be directed.

b. At the command DETAILS, POSTS, he procures a telephone with head set and hand set and takes post as directed. He reserves the hand set for the use of any person to whom the battery commander may wish to speak personally.

c. At the command EXAMINE GUN, he connects his telephone and establishes communication with the battery commander's station, reporting to the gun commander in case of failure to obtain satisfactory communication.

d. At the command LOAD or COMMENCE FIRING, he transmits the command and continues to transmit all messages until properly relieved from his duties.

■ 14. DISPLAY BOARD OPERATORS.—*a.* The azimuth (deflection) and elevation display board operators are responsible to the gun commander for the proper operation of the display boards and recording of all data received from the fire control car.

b. At the command DETAILS, POSTS, they procure chalk, blackboard erasers, forms for recording data, and telephones, and take post at their display boards.

c. At the command EXAMINE GUN, they clean the display boards if necessary, put on the telephone head sets, test the telephones to the fire control car, and report to the gun commander "Azimuth (deflection) display board or elevation display board in order," or report any defects they are unable to remedy without delay.

d. At the command TARGET, as soon as they receive azimuths (deflections) and elevations from the fire control car, they post them on the display boards and record them on a record sheet. They place a check mark on the record sheet opposite the data at which the gun is fired.

e. At the command CEASE FIRING, they continue posting and recording data received from the fire control car until the command CEASE TRACKING is received.

■ 15. AIMING RULE OPERATOR.—*a.* The aiming rule operator is responsible to the gun commander for the proper operation, care, and adjustment of the aiming rule.

b. At the command DETAILS, POSTS, the aiming rule operator assisted by No. 7 procures the aiming rule sight and crossbar, places them near the aiming rule stakes, and takes post behind the aiming rule stakes facing the piece.

c. At the command EXAMINE GUN, the aiming rule operator places the aiming rule crossbar in position on the stakes and places his sight in its bracket on the crossbar. He sets the data determined during orientation of the aiming rule on his sight, moves the sight along the bar until the vertical cross wire is exactly on the center line of a targ placed on top of and centered on the gun sight (see fig. 3), and reports, "Aiming rule in order," or reports any defects which he is unable to remedy without delay.

d. At the command TARGET, he keeps the vertical cross wire on his sight exactly on the center of the targ of the gun panoramic sight by sliding his sight along the crossbar without changing the deflection set on his sight.

e. At the command RE-LAY or CEASE FIRING, he continues to perform the duties prescribed under the command TARGET unless otherwise directed.

■ 16. CHIEF OF AMMUNITION.—*a.* The chief of ammunition (noncommissioned officer) is responsible to the chief of section for the—

(1) Efficiency of the personnel under his charge.

(2) Care and preservation of the ammunition and the ammunition car or magazine, including the equipment contained therein.

(3) Camouflage discipline and gas discipline at the ammunition cars or shelters pertaining to his section.

(4) Observance of all safety precautions in the care and service of ammunition.

(5) Security and careful handling of the ammunition and its protection against water, dampness, fire, and the direct rays of the sun.

(6) Uninterrupted service of ammunition during action.

b. He keeps a record of all ammunition received and that used by his gun, exercising particular care that projectiles and fuzes are listed under proper name and type.

c. He keeps the chief of section informed regarding ammunition on hand, checks the weights of projectiles, and reports defects found in the ammunition.

d. He keeps a thermometer in a selected powder container and reports the temperature of the powder when directed.

e. At the command DETAILS, POSTS, he opens the ammunition car or magazines and posts the members of the ammunition squad.

f. At the command EXAMINE GUN, he inspects the matériel under his charge, gives the necessary instructions for preparing ammunition and equipment for firing or drill, and reports to the chief of section, "Ammunition service in order," or reports any defects he cannot remedy without delay.

g. At the command LOAD, he directs and supervises the service of ammunition.

h. At the command REPLACE EQUIPMENT, he supervises the replacing of equipment, sees that all matériel is properly secured, forms his squad, and reports to the chief of section.

■ 17. AMMUNITION SQUAD.—*a.* At the command DETAILS, POSTS, the ammunition squad (Nos. 11 to 16, inclusive, at peace strength; Nos. 11 to 17, inclusive, at war strength) takes post in the ammunition car or as directed by the chief of ammunition.

b. At the command EXAMINE GUN, the squad prepares the car equipment and the ammunition for firing or drill.

c. At the command LOAD—

(1) Nos. 11 and 12 stationed outside the car receive in turn the powder charges and deliver them to No. 2 on the gun platform.

(2) Nos. 13 and 14 remove the powder charge from the container and stand ready to deliver it to No. 11 or 12.

(3) No. 15 is responsible for the proper fuzing of projectiles.

(4) Nos. 16 and 17 stand ready to refill the projectile rack on the gun platform as opportunity offers.

d. At the command REPLACE EQUIPMENT, the ammunition squad secures all matériel.

■ 18. ARTILLERY MECHANICS.—The artillery mechanics are members of the executive officer's detail. Assisted by members of the gun sections they make such minor repairs and adjustments as can be made with the means available. The chief artillery mechanic is the custodian of the supplies pertaining to the gun emplacements to which his battery is assigned. He is responsible for the condition of the supply cars (or storerooms) pertaining to the gun emplacements and the supplies contained therein. The chief mechanic or his assistant issues such equipment, tools, oils, paints, and cleaning materials to the members of the gun sections as may be necessary for the service and care of the guns and accessories.

SECTION IV

NOTES ON THE SERVICE OF THE PIECE

■ 19. GENERAL.—*a.* The service of the piece will be conducted with dispatch and precision and with as few orders as possible. Except for the necessary orders, reports, and instructions, no talking will be permitted. Cannoneers will change positions at a run, except those men posted on the carriage who will change positions as rapidly as practicable.

b. Commands will be given in the prescribed forms (see FM 4–5). Signals may be substituted for commands whenever practicable (see FM 4–20).

c. Loading with dummy ammunition and pointing the piece as for firing is the normal practice at drills.

d. When there is a lull in the firing or drill, each member of the gun section will inspect, clean, and place in the best condition possible the matériel under his charge. Prior to and during lulls in firing, No. 5 and the ammunition detail place as many extra projectiles as practicable on the floor of the gun platform.

■ 20. SERVICE OF AMMUNITION.—When action or target practice is imminent, the ammunition car loaded with projectiles and powder charges will be placed immediately behind the gun. Primers and point detonating fuzes will be stored in a convenient place away from the projectiles and powder charges and protected from the weather.

■ 21. OPENING BREECH.—No. 2 turns the rotating latch 45° to the right and with his left hand turns the rotating crank one and three-fourths turns clockwise. No. 1 turns the translating crank counterclockwise three turns with his left hand, ending the turns with a quick motion to bring the block into its final position in the tray with a jar which will release the tray latch. He grasps the tray handle and swings the tray about the hinge pin until the tray back latch engages in the catch. (See fig. 3.)

■ 22. CLOSING BREECH.—No. 2 releases the tray back latch with his left hand, swings the tray to the face of the breech, and turns the translating crank three turns in a clockwise direction. No. 1 turns the rotating latch 45° to the left (this releases the rotating crank lock) and turns the rotating crank one and three-fourths turns counterclockwise. (See fig. 3.)

■ 23. LOADING.—The storage box or the rack on the gun platform should be filled with projectiles prior to the command LOAD. At the command LOAD, No. 5 places a projectile in the loading tray, hoists it to the height of the breech, swings it around by the crane, and guides the point into the breech for ramming. A convenient method for gaging the height to which the projectile must be raised is to tie a marking string on the chain of the triplex block. No. 6 brings up the rammer and the projectile is rammed home by the chief of breech and Nos. 1, 2, and 6. When ramming, the projectile is pushed

slowly off the tray and then rammed home with all possible force, the speed of the rush being increased so that the maximum force is exerted as the projectile goes into its seat. The powder detail passes the propelling charge to No. 2 who inserts it in the powder chamber. Nos. 1 and 2 close the breech and fold back the hinged floor plate. After the breechblock is rotated and locked, the chief of breech inserts the primer, lowers the firing leaf, signals or commands: ELEVATE, and after the report, "Elevation set," hooks the lanyard and calls "Primed."

■ 24. CHANGING POWDER CHARGE.—In the event that it becomes necessary to change the powder charge either by removing or inserting the increment, after the command RE-LAY has been given, the gun commander will give the necessary instructions. At his command the designated cannoneers will perform such portions of the duties prescribed for the commands CEASE FIRING or LOAD as are applicable.

■ 25. POINTING AND FIRING.—*a.* (1) For case III firing, the gun pointer sets on his sight the azimuth posted on the display board and (assisted by No. 3) traverses the piece until the vertical cross wire of his sight is on the aiming point or aiming rule. The elevation setter sets on his quadrant the elevation posted on the display board, and assisted by No. 4 elevates the piece until the level bubbles are centered and calls or signals, "Elevation set." The elevation setter should lay the gun in the same manner each time by depressing to the proper setting rather than by setting sometimes by elevating and sometimes by depressing. The gun pointer then centers the cross level bubbles, traverses the piece until the vertical cross wire of the sight is accurately on the aiming point, and calls or signals, "Azimuth set." After the chief of breech calls "Primed," the gun commander commands or signals: FIRE, at the sounding of the proper time interval signal.

(2) For case II firing, the gun pointer sets on his sight the deflection posted on the display board and (assisted by No. 3) traverses the piece, keeping the vertical cross wire of his sight on the target; the elevation setter sets his data as in (1) above. After the elevation setter calls or signals, "Elevation set," the gun pointer centers the cross level bubbles, traverses

the piece to keep the vertical cross wire of his sight on the target, and when the gun commander calls, "Ready," he commands: FIRE.

b. At the command or signal FIRE, No. 7 pulls the lanyard. After the piece is fired, the gun is depressed to the loading position, the hinged floor plate replaced by Nos. 1 and 2, the lanyard unhooked by the chief of breech, and the breech opened by Nos. 1 and 2. No. 10 hands the sponge to No. 6, who assisted by No. 1 sponges the powder chamber and returns the sponge to No. 10. No. 1 wipes off the mushroom head and breechblock, oiling the threads if required. The chief of breech removes and throws away the fired primer, clears the vent, and cleans the primer seat.

■ 26. DRILL DURING SIMULATED FIRING.—For simulated firing using dummy ammunition, the following procedure is recommended:

a. For the first and succeeding odd-numbered rounds, the operations of loading, pointing, and firing are as given above for service ammunition.

b. For the second and succeeding even-numbered rounds, the operation of unloading is substituted therefor. As soon as the projectile is removed, No. 1 closes the breech and the operations of pointing and firing proceed as for service ammunition.

■ 27. THE COMMAND RE-LAY.—At the command RE-LAY, the gun pointer and elevation setter continue to point the piece in direction and elevation as at the command LOAD; display board operators post the new data on their display boards as they receive it and No. 7 slacks his lanyard.

■ 28. THE COMMAND STAND FAST.—If it is desired to halt all movements of matériel and personnel, the officer in charge of the emplacement or the chief of section commands: STAND FAST.

SECTION V

SAFETY PRECAUTIONS

■ 29. GENERAL.—The following safety precautions apply to 8-inch guns mounted on M1918 barbette railway carriages on

railway cars, M1918MI, and are prescribed for peacetime conditions. They indicate as well the principles to be followed under war service conditions, but should be interpreted by the battery executive according to the circumstances existing at the time of any particular emergency. Further instructions concerning safety precautions are prescribed in AR 750–10 and FM 4–20.

■ 30. THE COMMAND CEASE FIRING.—*a.* Any individual in the military service will command or signal CEASE FIRING if he observes any condition which makes it unsafe to fire.

b. At the command CEASE FIRING, given when the piece is loaded, the lanyard will be detached.

■ 31. FIRING MECHANISM, M1903.—*a.* The firing mechanism will be inspected and tested frequently, and immediately before firing, to insure proper operation and functioning of the safety features.

b. To test the safety features of the mechanism, a friction primer will be inserted before the breech is rotated. A strong pull will be exerted on the lanyard while the block is being rotated to ascertain if it is possible to fire the primer before the breechblock is locked.

■ 32. LANYARD.—The lanyard will be pulled with a quick, strong pull (not a jerk) from a position as near the rear of the piece as is convenient.

■ 33. PRIMERS.—Precautions in the care and handling of primers will be observed as follows:

a. Prior to firing, the primer pouch will be examined to make certain that it contains live primers only.

b. Care will be taken not to drop primers.

c. Except when used in test of safety features, primers will not be inserted until after the breechblock has been closed and locked in its recess.

d. Primers will never be inserted or removed by means of the button or wire.

e. The greatest care will be exercised in lowering the leaf of the firing mechanism.

f. Fired primers will be discarded as soon as they are removed from the firing mechanism.

g. Necessary precautions will be taken to prevent any attempt to use a primer that has failed.

h. Any primer removed after an attempt to fire will be handled with great care because of the possibility of a primer hangfire.

■ 34. FUZES.—Normally projectiles equipped with base detonating fuzes will be received properly fuzed for firing, and projectiles equipped with point detonating fuzes will be received unfuzed. The latter will be fuzed as required in the following manner:

a. Unscrew the plug from the fuze socket.

b. Insert the fuze, being careful to see that it is fitted with its felt or rubber washer, and screw it home by hand.

c. Screw up the fuze with the fuze wrench but without using any great force.

d. If there is any difficulty in screwing home the fuze, it should be removed and another inserted. If the same trouble is experienced with the second fuze, the shell should be rejected.

e. For further instructions on the care and handling of fuzes see FM 4–20 and appropriate Technical Manuals.

■ 35. SERVICE OF POWDER CHARGES.—In the ammunition car (or at the field magazine) all powder charges will be kept in their containers except the charge which is to be served to the piece for the next succeeding round. The powder charge for any given round will not be brought near the breech until the preceding round has been fired, the powder chamber sponged, and the face of the mushroom head wiped.

■ 36. SPONGING POWDER CHAMBER.—After each shot the powder chamber will be sponged and the face of the mushroom head wiped with the liquid provided for that purpose (see par. 49).

■ 37. COVER FOR GUN SECTION.—When firing high explosive ammunition and cover is prescribed, each member of the gun section will be required to take adequate shelter each time the piece is fired. (See AR 750–10.)

■ 38. POOR VISIBILITY.—During target practice, firing will be stopped at once if visibility becomes so poor as to endanger the tug or shipping in the field of fire.

■ 39. MISFIRES.—*a. General.*—A misfire occurs if the piece fails to fire when desired. In case of a misfire all personnel remain clear of the path of recoil, and the piece is kept pointed at the target or at a safe place in the field of fire.

b. Primer heard to fire.—If the primer is heard to fire, it will *not* be removed nor the breechblock opened until 10 minutes have elapsed since the primer fired.

c. Primer not heard to fire.—If the primer is not heard to fire, at least three attempts will be made to fire it. If a special device, by which the primer can be removed by an individual standing clear of the path of recoil, is available, the primer may be removed and examined 2 minutes after the last attempt to fire. If the primer *has not fired* a new one may be inserted and firing continued. If the primer *has fired,* a new primer will not be inserted nor the breechblock opened until at least 10 minutes have elapsed since the last attempt to fire. If such a special device is not available, the primer will not be removed nor the breechblock opened until 10 minutes have elapsed since the last attempt to fire. (See FM 4–20.)

SECTION VI

CARE AND ADJUSTMENT OF MATÉRIEL

■ 40. GENERAL.—*a.* Officers will be held strictly responsible for the proper care and preservation of all artillery matériel in their charge.

b. The methods prescribed for the operation, care, and preservation of matériel are those described herein and in other publications issued by the War Department (see Appendix), a thorough understanding of which is required on the part of all officers and others having matériel in their charge.

c. Major repairs will be made by the services concerned. Adjustments and minor repairs will be made by battery personnel.

■ 41. RECOIL MECHANISM.—The recoil mechanism is contained in one recoil cylinder located below the gun and four recuperator cylinders located above and below the gun. (See figs. 3 and 4.) The length of recoil (48 inches) is uniform for all elevations. The recoil cylinder should be kept full of oil at all times. It should be drained and refilled once every 3 months. Once every 3 years it should be disassembled, cleaned thoroughly, and inspected.

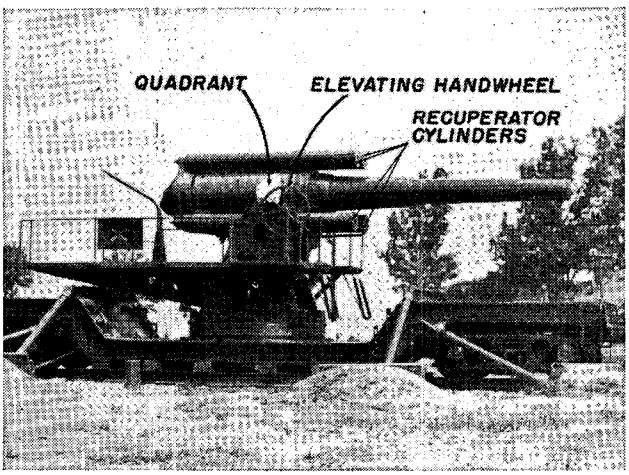

FIGURE 4.—8-inch gun in firing position.

■ 42. TO FILL RECOIL CYLINDER.—The recoil cylinder is filled with recoil oil, light, as follows:

a. Elevate the gun to maximum elevation (42°).

b. Attach the filling device to the filling valve at rear end of cylinder.

c. Open the filling valve plug until oil can pass from the filling device to the cylinder.

d. Open vent at forward end of cylinder.

e. Pour oil into cylinder until it reaches level of vent, close vent, close filling valve plug.

f. Drain the oil from the filling device through the petcock at the lower end of the vertical pipe and collect it in an oil can.

g. Remove the filling device.

■ 43. OBTURATOR, GUNS M1888, M1888MI, AND M1888MII.—*a.* With the breechblock in open position, the obturator spindle with split rings, gas check pad, and filling-in disk upon it is inserted into the block. Special care must be taken that the front and rear split rings are not interchanged. The four obturator spindle washers and the dust cover are put in place upon the rear end of the spindle projecting through the block, bronze and steel washers alternately, with a bronze washer first and the dust cover last. The spindle is secured by screwing up the spindle nut by hand. Then the breechblock is translated and rotated halfway into the firing position. The split nut is then screwed up as tightly as possible by one man with the wrenches provided for that purpose and locked in place by the clamping screw. The spindle is properly adjusted if, while it has no play longitudinally, it can be turned around freely by taking hold of the mushroom head with both hands.

b. If after firing a few rounds the spindle is found to have longitudinal play, the adjusting operation described above is repeated.

c. The proper adjustment of the obturator is of great importance. It will not be made with the breechblock in open position as to do so will cause injury to the gas check pad.

■ 44. OBTURATOR, GUN MK. V.—This paragraph applies to the 8-inch gun, Mk. V, equipped with breech mechanism, Mk. V.

a. With the breechblock in open position, the obturator spindle with split rings and gas check pad upon it is inserted into the block. The obturator spring is placed on the spindle and the obturator nut screwed on until the rear end of the nut is flush with the shoulder in rear of its thread. With the rear end of the nut flush with the shoulder, the keyway in the nut is lined with the keyway in the obturator spindle and the nut is given one more complete turn. The obturator nut key is then driven home. This is the correct position for the nut as it gives the proper amount of compression to

the obturator spring. If after long use the obturator shows signs of being loose, the obturator nut should be given one more complete turn.

b. Before setting the obturator nut up tight, the gas check pad and split rings must be centered. If they are not centered properly, when the breechblock is closed the front edge of the front split ring will strike the rear face of the tube and may cause injury to the ring or bur the gun.

c. A hexagonal portion of the obturator spindle meshes with a hexagonal cut in the hole of the breechblock, thus forcing the obturator to rotate with the block.

■ 45. FIRING MECHANISM, M1903.—*a. Care.*—(1) While this mechanism forms part of a heavy gun, the parts are very closely adjusted and the clearances very small. *The greatest care must be exercised therefore in keeping the mechanism well oiled and free from rust and dirt.* It will be removed from the gun when not in use, kept in the small box provided for it, and stored in the armament chest.

(2) Distortion of the firing leaf or battering of the safety bar seat in the side of the firing leaf may be caused by the application of force under the firing leaf to raise it. The application of force in this manner is prohibited.

b. (1) *To assemble.*—(*a*) Clasp the hinged collar over the end of the spindle with the two ribs of the collar engaging in the corresponding grooves of the spindle, keeping the hinge at the top.

(*b*) Take the mechanism in the right hand, holding the collar with the left, and put the mechanism over the end of the collar. Screw the collar to the left until the catch on the under side of the mechanism engages and locks it in position. While doing this, see that the guide bar which projects from the right side of the mechanism enters the groove cut in the breechblock for it, and that the pin on the safety bar slide (which is attached to the gun) enters the hole in the outer end of the safety bar of the mechanism. *Do not attempt to use the mechanism until it is absolutely certain that the collar has been screwed entirely home and locked.*

(*c*) After the primer has been inserted, lower the slide until the catch engages in the notch of the housing. *Be sure the*

slide is entirely down before attempting to fire the piece; otherwise the primer may be blown to the rear, endangering members of the gun squad.

(2) *To disassemble.*—(*a*) To remove the mechanism from the spindle, draw the collar catch to the rear and unscrew the hinged collar.

(*b*) To remove the slide from the housing, draw the slide stop out to the left as far as it will go. The slide may then be lifted from the housing.

(*c*) To remove the firing leaf and slide catch from the slide, start the split pin which passes through the leaf pivot by pressing upon it and then draw it out. The pivot is then free to be removed, and its removal frees the leaf and slide catch from the slide.

(*d*) The collar catch may be removed by unscrewing the screw at the lower edge of the housing.

(*e*) The slide stop may be removed by unscrewing it from the housing with the wrench provided for that purpose. The slide stop should not be removed except when necessary to repair it or to replace a broken spring.

c. Safety features.—(1) There is a safety lug on the right side of the housing which prevents the firing leaf from being drawn back until the slide is all the way down.

(2) There is also a safety bar which holds the firing leaf until it is withdrawn by the safety bar slide, actuated by the rotation of the block.

d. Inspection and tests.—(1) From time to time *and before firing,* the firing mechanisms will be carefully inspected to insure that all parts are in good condition. Any firing leaf that is damaged to the extent that firing the gun is possible before the breechblock is closed and locked, or any spring found too weak to keep the firing leaf pressed against the slide, will be replaced.

(2) A firing mechanism which has been tried and is known to function satisfactorily in a particular gun will be stamped with the serial number of that gun, and will be used with that gun in order to insure proper functioning.

(3) Previous to firing, all primers to be used will be inserted in the obturator spindle in order to test the proper fit of each primer. The firing leaf and slide will be lowered to their fir-

ing position in order to demonstrate that these parts will function properly with each primer.

■ 46. FIRING LOCK, MK. VIII.—This paragraph applies to the 8-inch gun Mk. V., equipped with breech mechanism, Mk. V. Combination percussion and electric primers are used in this firing lock.

a. The receiver or main body of the lock is screwed on the rear end of the obturator spindle and is secured by the receiver latch which enters a square slot in the spindle. The primer is supported in its seat in the spindle by the wedge which closes behind it and is worked up or down to its closed or open position by twisting the hammer stem.

b. To cock the lock, grasp the hammer pull and pull gently to the rear about 1/16 inch. Then turn to the left about 45°, keeping up a pull to the rear. When the hammer begins to move directly to the rear, keep a slight pressure tending to revolve it to the right. When the hammer has reached its rear position, it will then revolve to the right 45°, bringing the hammer contact piece in line with the firing pin and the sear will engage the hammer stem.

c. To ease down the hammer, grasp the hammer pull and pull it about 1/16 inch to the rear. Then revolve to the left 45° and ease down until hammer brings up, then revolve again to the right 45° into the closed position.

d. To reprime the lock, grasp the hammer pull and pull it to the rear about 1/16 inch. Then rotate to the left until wedge is in its lowest position. Insert primer, then revolve hammer until the hammer contact piece is in line with firing pin.

e. Care should be taken in the use of this lock to prevent danger of breaking the lock through undue strains in an attempt to cock it by pulling the hammer directly to the rear.

■ 47. SLIP FRICTION DEVICE.—A multiple disk slip friction device is included in the traversing mechanism between the traversing worm wheel and the pinion shaft. This device provides a safeguard against breaking of the parts of the traversing mechanism when the piece is fired. Pressure is applied to the friction disks by screwing the pinion shaft nut

against the adjusting collar through the Belleville springs and friction disk collar. The device is adjusted properly if two strong men can make it slip by turning the traversing handwheel.

■ 48. ANTIFRICTION DEVICE.—*a.* The antifriction device is a mechanism used to eliminate the friction between the cradle trunnion and its bearing and to make elevating and depressing the gun easier. The trunnion is supported by a crutch which rests on a lever arm or beam which is pivoted at one end. The other end of the lever arm is supported by a steel rod on Belleville springs. Adjusting screws on this rod permit the lever arm to be drawn up until the weight of the gun is supported by the crutch and beam.

b. The device is adjusted properly when the clearance between the trunnion and trunnion bearing is 0.003 inch. This clearance must be checked carefully before each drill or firing.

■ 49. SPONGING SOLUTION.—*a.* The sponging solution is a solution of water and castile soap. Its purpose is to provide a sponging liquid which will extinguish burning residue in the chamber of the gun and also serve to lubricate the breech recess. If the soap solution is not available, plain water may be used.

b. The preparation of the solution consists of dissolving 1 pound of castile soap in 4 gallons of water. Yellow soaps should not be used as they are liable to leave a gummy deposit in the breech recess. The soap is shaved from the bar to facilitate dissolving. Then it is added to the water and the water heated until the soap is dissolved. The water should be stirred with as little agitation as possible to prevent foaming.

c. To avoid the necessity of handling large receptacles, as much soap as will be required may be dissolved in one bucket of water. This concentrated soap solution will be added to water in other receptacles in the prescribed proportions.

■ 50. CARE OF BORE.—*a.* As soon as possible after any period of firing and every day thereafter until all "sweating" has stopped, the bore of the gun will be cleaned, dried, and oiled.

The cleaning solution is made by dissolving ½ pound of soda ash in each gallon of boiling water. The bore is washed with this solution, using a bore sponge wrapped with burlap. Then the bore is wiped thoroughly dry with new burlap. Finally, the bore is coated with medium or heavy rust preventive compound, depending on local conditions.

b. Care must be exercised to prevent the staves of the sponges and slush and cleaning brushes from rubbing against the lower portion of the bore, as excessive wear of the lands will result from such practice.

SECTION VII

RAILWAY OPERATING EQUIPMENT

■ 51. GENERAL.—This section is intended to serve as a guide to battery commanders for the care and maintenance of the railway operating equipment of the battery, its preparation for movement, and for emergencies which may arise during movement. In time of peace, Interstate Commerce Commission Regulations and those of the local railroad companies will govern. Equipment which is accepted by one railroad may not be acceptable to another. Therefore, the battery commander must familiarize himself with the regulations of the railroad companies over which his equipment will be moved.

■ 52. ASSOCIATION OF AMERICAN RAILROADS CODE OF RULES.—*a.* Railroad companies will not accept railway equipment for movement which does not conform with the Association of American Railroads Code of Rules. Instructions concerning the care and upkeep of the running gear, air brake equipment, and other strictly railway operating features contained in these rules will govern the maintenance operations on all railway matériel.

b. Copies of these rules should be in the files of all ordnance officers charged with the maintenance of railway matériel. They can be obtained by application through channels to the Commanding Officer, Raritan Arsenal, Metuchen, N. J.

■ 53. BRAKES.—Each truck is equipped with both hand and air brakes, the hand brakes being so arranged that they oper-

ate through the same lever system as the air brakes. The air brakes are standard equipment. Local railway officials are usually very willing to cooperate by instructing a limited number of men in the care and maintenance of air-brake equipment in the railway repair shops. This instruction should be utilized whenever practicable. Association of American Railroads Code of Rules requires air brakes to be cleaned and tested annually and certain data stenciled on the equipment.

■ 54. JOURNAL BOXES AND BEARINGS.—*a. Care.*—The journal box bearing is a babbitt-lined bronze casting. Before being installed it must be thoroughly clean, have a smooth bearing surface free from irregularities, and must have a proper bearing on the journal. Sandpaper, emery paper, or emery cloth should never be used for the purpose of removing irregularities from the bearing surface. A half-round file or scraper should be used. Care must be taken that the wedge has a good contact on the crown of the journal bearing. The surface of the journal should be smooth and thoroughly clean before the bearing is installed. When installing a bearing, a coat of lubricating oil must be applied to the bearing surface. The bearing surface of a journal bearing should never be wiped with waste or any other material which may leave grit on the surface.

b. Packing.—(1) *General.*—Colored wool waste is used for packing the journal boxes. New waste must be soaked in car journal oil for at least 48 hours at a temperature of not less than 70° F. and then drained for 24 hours before being packed into journal boxes.

(2) *Application*—(*a*) *Inner.*—In packing a journal box, twist a rope of packing somewhat tightly and place it in the extreme back part of the box. It should be placed well up against the journal so as to lubricate properly the fillet on the journal and keep out the dust.

(*b*) *Main.*—Apply sufficient packing (preferably in one piece) to fill the space between the inner packing and the journal collar. Care must be taken to have this packing bear evenly along the full length of the lower half of the journal. The packing should not be too tight but should be tight enough to overcome any tendency to settle away from the

journal. The packing should extend to approximately the center line of the journal *but not above at any point,* and should be pressed down evenly at the sides so that no loose ends may work up under the journal bearings.

(*c*) *Outer.*—Apply a third piece of firmly twisted packing in front of the main packing and to the height of the bottom of the journal collar. Pack tightly in order to prevent displacement of the main packing. There must be no loose ends hanging out of the box as they tend to draw out the oil.

c. Base for jacks.—A piece of boiler plate or 4-inch by 6-inch oak plank sufficiently long to rest on two ties should be available as a base for each jack when changing bearings.

■ 55. COMPOSITE CLEARANCE DIAGRAM.—*a.* The composite clearance diagram (fig. 5) includes all coastal lines, Mexican border lines, some transcontinental lines, and a few central, north, and south lines. It allows 4 inches of clearance between actual obstructions and the outline. As it makes no allowance for curves, the overhang of the mount in rounding curves must be considered. It is safe to assume a maximum curve of 17°, 337 feet radius, on main lines. Overhang on curves is shown in the following table:

Degree curve	3	6	9	12	15
Overhang, inches	¾	1½	2 3/16	3	3 5/8

b. The Corps of Engineers maintains a complete and up-to-date record showing clearances, strength of bridges, and other pertinent data on all railroad lines.

■ 56. WEIGHT.—The weight of the mount is just as important as clearance in determining where and how it may be transported. The weight of this gun and mount (156,800 pounds) makes it advisable that the strength of all bridges, trestles, and culverts to be crossed is checked carefully either from data obtained from the Chief of Engineers or from the officials of the lines to be used.

■ 57. REQUIREMENTS OF GOOD TRACK.—A good track must be regular in alinement and profile and without kinks or sharp

bends. In going over the line to verify the profile by a glance of the eye, from time to time place the eye close to the rails, looking along the track as far as possible. The ends of the rails must not touch each other, as sufficient space for expansion between them is required. Each joint must be made

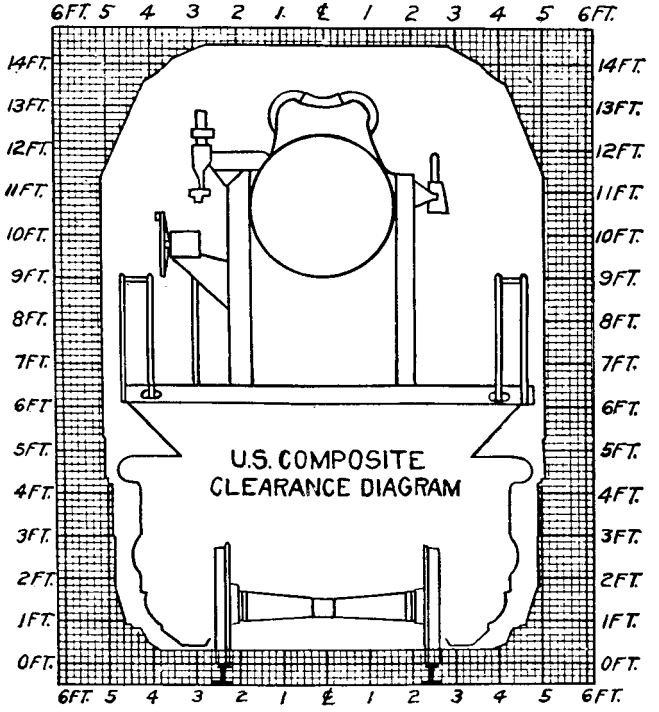

FIGURE 5.—Composite clearance diagram.

with 2 splice plates fastened with 4 bolts (6 bolts for heavy work). Every bent or broken rail must be replaced. Loose ties (insufficiently tamped) must be made solid by tamping. Broken and rotted ties which depress under the passing of trains must be replaced. The ballast must be porous and

firm. If the base is wet or muddy it lacks resistance and must be drained or the track will not retain its profile.

■ 58. MOVEMENT OF EXPLOSIVES.—The movement of explosives by rail is covered by regulations of the Interstate Commerce Commission and also by the municipal ordinances of various cities. Local railway officials should be consulted in reference to those regulations.

■ 59. MISCELLANEOUS PREPARATIONS.—The following suggestions are given to assist the battery commander in training his organization and preparing his matériel for railway movements:

a. Instruct the individual in charge of a rail movement in the procedure to be followed if repair work on the road becomes necessary, such as the supply department to which bills are to be sent, limitations on the cost of repairs he may authorize, and necessary forms and reports to be accomplished.

b. Have personnel trained and equipment available for packing journal boxes and replacing bearings. At each stop, all journals should be inspected for overheating.

c. Arrange for a preliminary inspection of running gear by the receiving railway officials.

d. Exercise the running gear whenever possible. Equipment should be moved a sufficient distance so that the journals will become "warmed up."

e. Have spare air hoses available.

f. Whenever possible move the gun with the muzzle trailing.

g. Be sure "explosive" labels are placed on ammunition cars.

h. Have sandbags and marlin available for revetments in case heavy rains threaten wash-outs on a firing spur.

SECTION VIII

EMPLACEMENT FOR FIRING

■ 60. GENERAL.—*a.* The method of emplacing described in this section permits firing through 360° traverse and from 0° to 42° elevation. Further detailed instructions on emplacing the piece may be found in Ordnance Pamphlet No. 1816. Figure 4 shows the mount emplaced for firing.

b. For purposes of explanation, duties in emplacing have been assigned to men by their numbers in the gun section. In actual practice the chief of section may find it necessary to reassign duties in accordance with the physical qualifications of the men.

■ 61. SITE.—The site selected should be on straight, level track with the level of the ground not much below the level of the ties. Deep ditches and swampy or extremely rocky soil should be avoided. (See FM 4–5.)

■ 62. PREPARATION OF POSITION.—*a.* Defective ties or any that do not give a good bearing surface outside the rails should be replaced. The track should be leveled both longitudinally and laterally. The ballast should be well tamped under the ties and the rails spiked to the ties if necessary.

b. The car is moved to the firing position.

■ 63. ASSEMBLY OF GROUND PLATFORM.—*a.* The beam lashing is unfastened from the side clip angle by unbolting the end from the wire clamps. (The clamps should be kept attached to the lashing for safekeeping and the latter swung out of the way but still attached to the loading box.) The jack blocks are removed from the top of the H-beams and placed to one side on the car platform.

b. The odd-numbered cannoneers under the direction of the elevation setter throw off two H-beams. These they place on the right side of the position, end to end, and parallel with and outside the rails, with the junction of the two opposite the center of the firing position, and connect them with two fish or connection plates and twelve 0.75- by 2.75-inch bolts. The even-numbered cannoneers under the direction of the gun pointer place the remaining two H-beams in a similar manner on the left side of the position.

c. The H-beams are lined up so that they are parallel to the track, an equal distance from the center line of the track, and so that their center lines are 6 feet 10 inches apart. The beams are also placed so that the ends of the two lines of beams are directly opposite each other.

d. Under the direction of the elevation setter, Nos. 9, 10, 11, and 12 unload and place a jack block under the two forward screw jacks. Under the direction of the gun pointer, Nos.

13, 14, 15, and 16 place a jack block under the two rear screw jacks. Nos. 5, 6, 7, and 8 throw off the six crossties.

e. Nos. 1 and 2 take post at the right front jack, the elevation setter (or No. 3) and No. 4 at the right rear, display board operators at the left front, and the aiming rule operator and battery commander telephone operator at the left rear jack, with ratchet levers and cranks. The gun commander personally directs the jacking up of the car. He coordinates the work of the four details so that the jacks are operated together.

f. Nos. 9 to 16 (or 17), inclusive, place the crossties under the car.

g. The jack details lower the car until the car sills rest on the ties. The gun commander coordinates the operation in the same manner as he does in raising the car.

h. All cannoneers working in reliefs dig the holes for the floats, assist in unloading the floats and shoes, and place them in position. Then they set the outriggers.

■ 64. JACKS.—*a.* Four screw jacks are provided so placed that they are directly above the rails when the car is used on standard gage track. The jacks are usually operated by crank handles which are fastened with split pins to the square ends of the shaft projecting through the side sills. When not in use, these handles are taken off and fastened to the sloping part of the floor plates by means of crank hooks provided. The jacks can be operated also by ratchet wrenches. When operating the jacks, no more than two threads should be exposed below the transom as further extension of the jack may damage it.

b. In order to oil the jacks conveniently, four holes with caps are provided in the floor plates over each jack. The hole nearest the center of the car is directly over the jack screw, and oil poured into it will lubricate both the jack screw and the worm wheel. The center hole of the other three holes on each jack comes directly over the worm and is used to oil the teeth of the worm and wheel. The remaining oil holes are used to oil the worm bushings.

c. There are two jack blocks 8 inches wide, 6 inches high, and 5 feet 8 inches long provided with each car. These blocks

have bearings for the jacks. In order to raise the car, the jack blocks are placed across the rails so that the two jack screws of each shaft will rest upon the bearing plates.

d. Two 20-inch, 25-ton auxiliary jacks having a total rise of 9 inches are carried on each railway car. They can be used for emergency purposes or in case the regular car jacks are out of order. Seats are provided on the end outrigger socket castings for these jacks when they are used to raise the car.

■ 65. OUTRIGGERS.—*a.* There are eight outriggers furnished with each car. These are used to prevent the car from tipping over or sliding on the ground platform when the gun is fired. When emplacing the gun for firing at naval targets all outriggers should be used.

(1) When the gun is emplaced the four *end* outriggers, which are permanently fastened in sockets on the side of the car, are swung out so that they make an angle of 30° with the side of the car body. They have a fixed ball fitted to one end and an adjusting screw and ball fitted to the other end. The adjusting screw is operated with a steel rod (tommy bar) which fits into holes provided next to the ball.

(2) When the gun is emplaced the four *side* outriggers are placed perpendicular to the side of the car body. They are made similar to the end outriggers except that they have tie rods extending from the adjusting screw nut to the lower part of the outrigger beam. The upper end of these outriggers has an eye instead of a ball and is fastened by means of 2.5-inch pins to the upper part of the outrigger beams.

b. Outrigger float pits are dug so that the ball end of each outrigger is on a level with the bottom of the track crossties. These pits should be close enough to the car so that they will fit the outriggers when adjusted to minimum length. The bearing surfaces of the pits should be perpendicular to the outriggers and should be smooth in order to give uniform bearing for the floats. A mound of earth is built behind the exposed part of the float. All loose earth is well tamped. (See fig. 4.)

SECTION IX

WITHDRAWAL FROM POSITION AND PREPARATION FOR RAILROAD TRAVEL

■ 66. GENERAL.—It may be stated as a general rule that the members of the gun section handle the same elements of matériel in preparing the gun for railroad travel as they handle in preparing it for firing. Float holes should be filled and the roadbed and track left in good condition.

■ 67. LOADING AND SECURING EQUIPMENT.—*a.* Six of the floats, all the footplates, and all the side outrigger struts are placed on the car platform on the end opposite the loading box. The floats are piled in an inclined position with guide angles horizontal against the two float loading brackets attached to the outrigger beam. The first float is placed with its lower surface against the float brackets. The second float is placed in a similar manner against the first float and so on. The footplates are piled between the tool chests in front of and leaning against the floats. The float lashing is put in place with the longer strand against the lower float angle and the shorter one against the upper angle. The footplate lashing (attached to the longer strand of the float lashing) is put in place and the lock bar locked. Then the whole lashing is pulled up tight with the turnbuckle. The other two floats are placed in the drop section of the car.

b. The side outrigger struts and tie rods are placed between the clip angles on the platform at diagonally opposite ends of the car. The strut pins are inserted in holes in the clip angles and in the eyes, and the other ends of the outriggers are held in place by toggle pins which are inserted in holes in the clip angles. The rods pinned to these struts are fastened by clamps attached to the strut so that they will not move about. The toggle pins in the end ladder hanger brackets are removed, the ladders swung up, and the end struts swung around and hung in their brackets under the side sills of the car. Then the ladders are swung back and fastened.

c. The tie-supporting brackets are bolted across the floor plates with 0.75- by 1.5-inch bolts and lock washers. The six crossties are placed on these brackets with the clip angles vertical. Two H-beams with webs horizontal are placed along-

side the loading box on the opposite side of the car from the crossties. The remaining two H-beams are placed on top of the other two with their flanges staggered, and the jack blocks are placed on the webs of the top H-beams. The beam lashing, which is attached to the loading box at one end, is pulled over the beams. The end of the lashing is pushed through the clip angles on the edge of the car, pulled tight, and fastened with wire rope clamps.

d. The gun is secured in the traveling position.

■ 68. INSPECTION.—The gun commander inspects to see that all equipment is properly secured and does not project from the side of the car. He inspects the journal boxes for proper lubrication. He inspects the gun position for proper police and to see that all tools and equipment have been loaded. He sees that the gun is locked in the traveling position. He tests the brakes (hand and air) or sees that they are tested before the gun is hauled from the position.

SECTION X

STATISTICAL DATA

■ 69. 8-INCH GUNS, M1888, M1888MI, AND M1888MII.

Length	calibers	32
Length	inches	278.5
Weight	pounds	33,700

■ 70. 8-INCH BARBETTE CARRIAGE, M1918, AND RAILWAY GUN CAR, M1918MI.

Loading angle	degrees	0
Traveling angle	degrees	0
Firing angle	degrees	0 to 42
Traverse from center line (right or left)	degrees	180
Length between truck centers	inches	366
Length between pulling faces of couplers	inches	555
Number of trucks		2
Number of wheels per truck		4
Journals, inside	inches	6 by 11
Weight of truck	pounds	10,500
Total weight on track (including gun)	pounds	156,810
Loads at rail (average)	pounds	39,200
Length of recoil	inches	48

SECTION XI

DRILL TABLE

Service of the piece, 8-inch gun, railway artillery

Details	DETAILS, POSTS	(*a*) EXAMINE GUN (*b*) REPORT	TARGET	LOAD	CEASE FIRING
Gun pointer (noncommissioned officer). (See note 1.)	Procures sight and telephone head set, places sight in position on sight bracket, and takes post on gun platform in rear of sight, facing it. If azimuth circle is to be used, takes post on ground 2 feet from azimuth index scale, facing it.	(*a*) Examines sight and bracket (azimuth index scale); tests traversing mechanism (assisted by No. 3); supervises and assists in adjustment of aiming rule; and tests his telephone to fire control car. (*b*) Reports to gun commander, "Traversing in order," or any defects he is unable to remedy without delay.	See note 2	Continues setting azimuths as received. Keeps gun traversed so as to sight on aiming rule (aiming point). Keeps bubbles on cross level of sight centered. Checks setting of sight on aiming rule. When firing by case III, calls or signals "Azimuth set." When firing by case II, commands: FIRE, to No. 7 after gun commander has called "Ready."	Continues receiving and setting data until CEASE TRACKING is received.
Elevation setter	Procures telephone head set and takes post on gun platform, 1 foot in rear of elevation quadrant, facing it.	(*a*) Examines and adjusts quadrant; assisted by No. 4, examines and tests elevating mechanism; tests his telephone to the fire control car; and makes certain that gun is unlocked from travel position. (*b*) Reports to gun commander, "Elevation in order," or any defects he is unable to remedy without delay.	Sets elevation on quadrant.	Continues setting elevations as received. At command or signal ELEVATE, given by chief of breech, assisted by No. 4, elevates piece until bubbles of quadrant levels are centered, and calls or signals "Elevation set." As soon as piece has been fired, causes it to be depressed as rapidly as possible to loading position.	Continues receiving and setting data until CEASE TRACKING is received. When dummy ammunition is being used, causes piece to be depressed to loading position so dummy powder charge and projectile can be removed.
Chief of breech (noncommissioned officer).	Procures firing mechanism, primer pouch containing primers, punch, drill, and reamer, and pair of pliers; posts his detail and takes post 3 feet to rear of breech, facing it.	(*a*) Examines firing mechanism and places it on obturator spindle; cleans vent; and supervises work of breech detail. (*b*) Reports to gun commander, "Breech in order," or any defects he is unable to remedy without delay.	Stands by	When projectile is ready to be rammed, takes post on rammer behind No. 1 and commands: HOME RAM. When powder has been loaded and breech is rotated and locked, inserts primer, lowers firing leaf, signals or commands: ELEVATE, receives the lanyard thrown by No. 7, hooks it after report "Elevation set," calls "Primed," and takes post at right rear of breech. After piece has been fired, unhooks lanyard, and when breech has been opened removes primer, clears vent, and cleans primer seat. He listens for explosion of primer which may be audible if powder charge fails to explode.	Removes primer after breech has been opened. Supervises work of unloading and assisted by No. 6 withdraws projectile when dummy ammunition is used.
No. 1 (breech detail)	Procures cotton waste and can containing lubricating oil, places them convenient to breech, and takes post 1 foot to rear and 1 foot to right of breech, facing it.	(*a*) Assisted by No. 2, removes breech cover and places it on car platform. Examines, cleans, and oils breechblock and breech mechanism. (*b*) Reports to chief of breech any defects of matériel.	Stands by	After breechblock has been rotated by No. 2, translates it and swings it back until it is engaged by tray back latch. Takes post on right side of rammer near head and assists in ramming. After breechblock has been translated, he rotates it until closed. Assisted by No. 2, folds back hinged floor plate. As soon as piece is fired, assisted by No. 2, replaces hinged plate. Assists in opening breech and sponging chamber. Wipes off mushroom head.	Assists in opening breech for purpose of removing dummy ammunition or cleaning gun.
No. 2 (breech detail)	Procures cotton waste and translating crank, places crank in position and takes post 1 foot to rear and 1 foot to left of breech, facing it.	(*a*) Assists No. 1 in removing breech cover. Examines, cleans, and oils breech recess, gas check seat, chamber, and bore. (*b*) Reports to chief of breech if chamber or bore need cleaning.	Stands by	Unlocks rotating crank and rotates breechblock. Takes post on left side of rammer and assists in ramming. Receives powder charge from designated number of ammunition squad and inserts it in powder chamber so that it will be pushed into place by mushroom head when breech is closed. Releases tray back latch, swings breechblock into breech recess, and translates block. Assists No. 1 in folding back hinged floor plate. After piece is fired, assists No. 1 in replacing hinged floor plate and assists in opening breech.	When dummy ammunition is used, assists in opening breech, withdraws dummy powder charge and passes it to designated number of ammunition squad, and holds projectile tray.
No. 3 (traversing detail) (war strength only; see note 1).	Takes post on gun platform in front of and facing traversing handwheel.	(*a*) Traverses piece as directed by gun pointer. (*b*) No duties.	Traverses piece as directed by gun pointer.	Traverses piece as directed by gun pointer. As soon as piece has been fired, traverses it as rapidly as possible to loading position when necessary.	Traverses piece as directed by gun pointer.
No. 4 (elevating detail)	Assists No. 5 in procuring latter's equipment and placing it on gun platform. Takes post on gun platform in front of and facing elevating handwheel.	(*a*) Assists elevation setter in testing elevating mechanism. (*b*) No duties.	Depresses piece to loading position.	Elevates piece at command of chief of breech as rapidly as possible to approximate elevation posted on display board. As soon as piece is fired, depresses it as rapidly as possible to loading position.	Depresses piece to loading position unless otherwise directed.
No. 5 (hoist detail)	Assisted by No. 4, procures cotton waste, can containing light recoil oil, recoil filling devices, wrenches necessary in filling recoil cylinder, a shot tray, two triplex blocks, can containing grease for projectiles, and a brush. Places this equipment in convenient place and takes post on gun platform near crane masts.	(*a*) Assisted by No. 6, inspects and fills recoil cylinder, places triplex blocks on crane masts, examines, tests, and oils triplex blocks. (*b*) Reports to gun commander, "Recoil system and hoists in order," or any defects he is unable to remedy without delay.	No duties	With grease brush places rim of grease in front of rotating band on projectile; places projectile in shot tray, and with triplex blocks raises and moves projectile to breech, guiding nose into breech for ramming; as soon as projectile is rammed, revolves crane masts and makes another projectile ready for service on next round.	When dummy ammunition is used, moves dummy projectile to floor of gun platform or to overhead rail of the ammunition car by means of triplex blocks and crane masts.
No. 6 (rammer detail)	Procures rammer, placing it on clips provided on railing on right side of gun platform. If dummy ammunition is used, also procures hand extractor and places it on gun platform beneath rammer. Takes post on right side of gun platform, facing front.	(*a*) Assists No. 5 in filling recoil cylinder and returns filling device, wrenches, and oil can to tool car. (*b*) No duties.	No duties	Brings up rammer, places head against base of projectile and, assisted by chief of breech and Nos. 1 and 2, pushes projectile slowly forward to a position just inside chamber. Takes post on rammer in rear of No. 2 and assists in ramming. As soon as projectile is seated, assisted by chief of breech, removes rammer and returns it to clips. As soon as piece has been fired, receives sponge from No. 10, and assisted by No. 1 sponges powder chamber, withdraws sponge, and returns it to No. 10.	When dummy ammunition is used, inserts hand extractor in base of projectile and assists chief of breech in withdrawing dummy ammunition.
No. 7	Procures lanyard, assists aiming rule operator in securing his equipment, and takes post on ground in line with breech, facing it.	(*a*) Coils lanyard; removes muzzle cover and places it at designated place. (*b*) Reports to gun commander, "Lanyard in order," or any defects he is unable to remedy without delay.	No duties	Throws end of lanyard containing hook to chief of breech and stands ready to pull lanyard at command FIRE.	Coils lanyard after it is unhooked by chief of breech.
Nos. 8 and 9 (outrigger detail)	Procure tommy bar each and assist No. 10 in procuring sponge and tub containing sponging liquid, take post on ground at rear outriggers on side of piece to which assigned by gun commander, facing toward piece.	(*a*) Examine outriggers on side of piece to which assigned and adjust them so that each has a firm bearing on its footplate. (*b*) Report to gun commander, "Outriggers in order," or any defects they are unable to remedy without delay.	No duties	Inspect and adjust their outriggers after each shot	Duties as directed.
No. 10 (sponge detail)	Assisted by Nos. 8 and 9, procures sponge and tub containing sponging liquid and places them on ground near right rear of gun platform, takes post beside sponge, facing to front.	(*a*) Examines sponge (*b*) Reports to gun commander, "Sponge in order," or any defects he is unable to remedy without delay.	No duties	After each shot he passes sponge fully saturated with sponging liquid, but drained, to No. 6 who returns it to him after chamber has been sponged.	Duties as directed.

NOTES

1. Under peace strength organization, gun pointer performs duties of No. 3.
2. At command TARGET, gun pointer sets azimuth on sight; (assisted by No. 3) traverses gun so as to sight on aiming rule (aiming point); centers bubbles on cross levels of sight; checks setting of sight on center of aiming rule sight; and calls or signals "Azimuth set." If azimuth circle is to be used, lays gun to azimuth received from fire control car.

APPENDIX

LIST OF REFERENCES

Ammunition, drill	TM 9–905 (now published as TR 1370–D).
Ammunition, general	TM 9–905 (now published as TR 1370–A).
Camouflage, cover, protection against air and chemical attacks, local security, machine gun defense.	FM 4–5.
Care and maintenance of matériel	FM 4–20. TM 9–850 (now published as TR 1395–A). TM 4–245 (now published as TR 1160–20).
Commands	FM 4–5.
Examination for gunners	FM 4–150.
Fire control and position finding	FM 4–15.
Gunnery	FM 4–10.
Handbook of 8-inch Railway Gun Matériel.	Ordnance Document No. 1816.
Organization of the battery	FM 4–5. T/O 4–47.
Railway operating equipment	Association of American Railroads Code of Rules.
Reconnaissance, selection, and occupation of positions.	FM–5.
Safety precautions in firing	AR 750–10. FM 4–20.